Public Reporting of Cardiac Surgery Performance: Part 2—Implementation

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Appropriate implementation is essential to create a credible public reporting system. Ideally, data should be obtained from an audited clinical data registry, and structure, process, or outcomes metrics may be reported. Composite measures are increasingly used, as are measures of appropriateness, patient satisfaction, functional status, and health-related quality of life. Classification of provider performance should use statistical criteria appropriate to the policy objectives and to the desired balance of sensitivity and specificity. Public reports should use simplified visual or tabular presentation aids that maximize correct interpretation of numerical data. Because of sample size issues, and to emphasize that cardiac surgery requires team-based care, public reporting should generally be focused at the program rather than individual surgeon level. This may also help to mitigate risk aversion, the avoidance of high-risk patients.

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Part 1 of this two-part series discussed the history of public reporting, its ethical rationale, and the positive and negative consequences that have been observed when public reporting has been implemented. In Part 2, we examine the major methodological issues that must be considered in public reporting of provider performance. Although we focus on cardiac surgery, in particular the recent initiatives of The Society of Thoracic Surgeons (STS), many of these implementation guidelines are broadly applicable to other areas of healthcare.

In this report, the term "provider" is used to signify hospitals or groups of physicians or surgeons, which reflects our preference to report at these levels. References to individual practitioners are explicitly noted.

Types of Measures

Performance measures for public reporting are often classified into specific categories, the most common being the Donabedian triad of structure, process, and outcomes. Credible risk-adjusted outcomes based on clinical data are currently unavailable in many areas of healthcare, and this has led to interest in the use of structure and process measures. When such measures are used for public reporting, they should have a demonstrable causal link with outcomes and should be as proximate to those outcomes as possible in the continuum of care.

Structural Measures

Procedural volume is the most commonly used structural quality measure, and for some procedures such as esophagectomy and pancreatectomy, it is an acceptable outcomes proxy. For coronary artery bypass grafting (CABG) operations, however, the volume–outcome association is weak, and thus, widely available direct outcomes metrics should always be used [1–5]. Many lower-volume programs have excellent results, although the lowest performing programs are generally found within this group and their outcomes are also less reliably measured due to the small number of cases. Identifying very low-volume programs for closer scrutiny may be a worthwhile use of volume reporting in cardiac surgery.

Process Measures

Process measures for public reporting must be carefully selected and specified. This includes defining appropriate eligibility and exclusion criteria [6], which is somewhat analogous to risk adjustment in outcomes measures. Whether by specifying a relatively circumscribed population for process measures or adjusting for case-

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mix and severity in outcomes measures, the goal is to assure equitable comparisons of provider performance.

Although more readily available than outcomes measures, the validity of process measures for assessing provider quality has been challenged. Some observational studies, particularly in adult cardiology, have shown a weak link between process measure adherence and short-term outcomes [7–13]. However, longer-term follow-up (as in the original clinical trials) may be necessary to demonstrate the full effect of some processes of care such as medications for chronic heart failure.

Numerous explanations have been suggested for the discordance in some studies between process adherence and outcomes. For example, although providers may effectively implement certain National Hospital Quality Measures, such as smoking cessation counseling or provision of discharge instructions, the subsequent behaviors of patients after hospital discharge are uncertain and less controllable [14]. Furthermore, in some instances, concerns about reimbursement or reputation may lead providers to focus on satisfying the "letter" rather than the "spirit" of process measure specifications, with subsequent reduction in effectiveness [10]. Some time-sensitive process measures may even have unintended negative effects, such as premature activation of the interventional laboratory for patients with myocardial infarction [15] or premature antibiotic administration for patients with a possible but not proven diagnosis of pneumonia [16].

Within adult cardiac surgery, the National Quality Forum has endorsed five process measures for CABG procedures, including use of the internal mammary artery, preoperative β-blockade, and discharge prescription of antiplatelet agents, antilipid agents, and β-blockers. These five measures are routinely reported to participants in the STS Adult Cardiac Surgery Database, and all are incorporated into the STS CABG Composite Score [17, 18] (Table 1), which is now publicly reported [19, 20].

Table 1. The Society of Thoracic Surgeons Coronary Artery Bypass Grafting Composite Score

Domains	Component Measures
Risk-adjusted operative mortality	Risk-adjusted operative mortality
Risk-adjusted morbidity ("any or none")	Renal failure
	Stroke
	Sternal infection/mediastinitis
	Reoperation for cardiac causes
	Prolonged ventilation
Use of the internal mammary artery	Use of the internal mammary artery
Use of recommended perioperative medications ("all or none")	Preoperative β-blockers
	Discharge antiplatelet agents
	Discharge antilipid agents
	Discharge β-blockers

Outcomes Measures

Outcomes are generally regarded as the most important healthcare quality metrics [21]. They are of greatest relevance to patients, and they integrate the net effects of measured and unmeasured structures and processes of care. CABG mortality remains the paradigm for public outcomes reporting and has been used for more than 2 decades in some states [22]. The National Quality Forum has also endorsed other important CABG outcomes measures, including postoperative stroke, renal failure, surgical reexploration, prolonged ventilation, and deep sternal wound infection. All these measures are included in the STS CABG Composite Score [17, 18] (Table 1). All outcomes measures should be risk-adjusted to account for inherent differences in patient risk at the time of presentation.

National focus on late events after hospitalization is increasing. In the future, evolving linkages of the STS National Database with various administrative sources, such as Medicare fee-for-service claims data [23] and the Social Security Death Master File, will permit long-term patient outcomes to be analyzed and reported. Patients are interested not only in their 30-day survival probability but in what they can expect several years after their surgical procedure. This includes not just survival but also the likelihood of requiring readmissions or reinterventions.

Although the quality of care provided on the index hospitalization is only one factor influencing the likelihood of these longer-term outcomes, it does add incremental information that may be useful in informed decision making regarding choice of treatment or provider. Longitudinal follow-up data will also provide health planners with information on long-term total costs and resource utilization, adjusted by patient preoperative characteristics. Finally, providers will be able to compare their adjusted long-term patient outcomes with national benchmark data.

Other Performance Metrics

As healthcare reform is implemented, it is likely that even more diverse portfolios of performance measures will be reported. These will be more comprehensive, encompassing other Institute of Medicine aims for the healthcare system such as:

- safety—fewer adverse hospital events and medical errors;
- timeliness—reduced waiting time;
- equity—reduce racial and ethnic disparities;
- effectiveness—treatment results are superior to alternatives, including no treatment;
- efficiency—minimize waste, maximize quality/cost ratio; and
- patient-centricity—respect patient preferences and goals.

Patient satisfaction with care (eg, the Consumer Assessment of Healthcare Providers and Systems, or CAHPS) and patient-reported outcomes, such as func-